

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today was **not** written for publication and is **not** binding precedent of the Board.

Paper No. 48

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JOHN ALLEN

Appeal No. 1999-2322
Application No. 08/430,311

ON BRIEF

Before FRANKFORT, PATE, and STAAB, Administrative Patent Judges.
FRANKFORT, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection (Paper No. 40) of claims 57 through 66 and 69 through 79. Claims 67 and 68, the only other claims remaining in the application, have been objected to by the examiner as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 1 through 56 have been canceled.

Appellant's invention relates to load bearing concrete panel structures and their method of production for use as decking material such as concrete bridge deck panels. The principle object of the invention is to provide a load bearing concrete panel which is less expensive and has better durability than existing concrete bridge deck panels due to the removal of reinforcing material in the upper panel which is now used in prior art load bearing concrete panels without loss of the utility of such panels (specification, page 14). Particularly, the invention is a load bearing concrete panel structure which uses structural plain concrete for at least the upper portion of the panel, wherein the plain concrete has, in preferred embodiments, been specially formulated and installed in a manner to resist temperature change and concrete shrinkage cracking at the upper surface and which relies on conventional flexural reinforcing materials being confined to the lower half of the panel to carry superimposed loads (specification, page 17). Different practices for improving crack control are taught in the specification on pages 19 and 20. Representative claim 74 is set forth below:

74. A load bearing concrete panel structure for use as decking material in a bridge structure, said panel being comprised of at least an upper layer of concrete and a lower layer of concrete, each said layer of concrete having a length dimension, a width

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dimension, and a height dimension of at least three inches, said upper layer of concrete having an upper surface which will come into contact with or be closely adjacent to loads which traverse the panel wherein the improvement comprises:

said upper layer being composed of substantially plain concrete, said plain concrete being a structural concrete in which the concrete is designed to carry all the flexural tensile stresses and any reinforcing material when present, is assumed not to carry any flexural tensile stress, and which said plain concrete structure is characterized as a structure whose maximum flexural strength is attained at the cracking load of the concrete; and

said lower layer includes structural flexural reinforcement means for bending moment stresses.

The prior art references of record relied upon by the examiner as evidence of anticipation and obviousness are:

Givens, Jr. (Givens)	3,808,085	Apr. 30, 1974
Kobayashi et al. (Kobayashi)	4,565,840	Jan. 21, 1986

Claims 57 through 63 and 69 through 78 are rejected under 35 U.S.C. § 102(b) as anticipated by Givens.

Claims 64 through 66 are rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Givens.

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Claim 79 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Givens in view of Kobayashi.

Rather than reiterate the examiner's full statement of the above-noted rejections and the conflicting viewpoints advanced by the examiner and appellant regarding the rejections, we make reference to the examiner's answer (Paper No. 45, mailed December 22, 1998) for the reasoning in support of the rejections, and to appellant's brief (Paper No. 44, filed October 5, 1998) and reply brief (Paper No. 46, filed February 22, 1999) for the arguments thereagainst.

OPINION

As a preliminary matter, we note that on page 14 of the appeal brief appellant states that claims 57 through 66, 69, and 71 through 78 stand or fall together, that claim 70 stands or falls alone and that claims 64 and 79 stand or fall together.

In reaching our decision in this appeal, we have given careful consideration to the appellant's specification and claims, to the applied prior art references, and to the respective positions articulated by the appellant and the examiner.

Prior to addressing the rejections made by the examiner under sections 102(b) and 103(a), we must first evaluate the scope of the claim language "said **plain concrete** . . . is **designed to** carry all the flexural tensile stresses and any reinforcing material, when present, **is assumed not to** carry **any** flexural tensile stress" (emphasis ours) found in independent claim 74 as well as each of the other independent claims on appeal. We understand this claim language to mean that a designer of the concrete panels will design the concrete panel assuming the plain concrete carries all the flexural tensile stresses regardless of whether the concrete actually carries all the flexural tensile stresses or not, and with the reinforcing material, if present, being assumed to carry none of the flexural tensile stresses regardless of whether the reinforcing material actually carries some amount of the flexural tensile stresses.

In attempting to determine the scope and content of the subject matter on appeal, we have concluded that the above-noted claim language requires us to delve into the mental process of a designer who is designing a load bearing concrete panel structure. It is a design decision to chose to ignore any contribution by the reinforcing material to the flexural strength

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of the plain concrete and also to decide that the plain concrete carries all the flexural tensile stresses. We can not speculate

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as to what assumptions a hypothetical designer would have made regarding the flexural strength imparted, if any, by the reinforcing material, when present, in plain concrete. Moreover, instruction on how this design decision will be made according to any particular load bearing concrete panel structure is not provided by appellant's specification. In our opinion, speculation and conjecture must be utilized by one of ordinary skill in the art, inasmuch as the claims on appeal do not particularly point out and distinctly claim the subject matter which the appellant regards as his invention.

We can not merely adopt a claim interpretation that the plain concrete carries **all** the flexural tensile stresses and the reinforcing material, if present, carries **none** of the flexural tensile stress. This interpretation requires us to accept that plain concrete, which includes some reinforcing material, would not increase the overall tensile strength of the concrete **at all**. We are of the opinion that some measurable amount of ductility (i.e. flexural strength) is imparted to the concrete by the reinforcing material, when present, due to the fibers stabilizing the concrete structure in the presence of cracks, thus, at a

minimum, nominally increasing the cracking strength and ultimate strength of the appellant's fiber-reinforced concrete over "plain concrete."¹

Moreover, the specification is not clear on whether appellant considers fiber-reinforced concrete to be "plain concrete" or "reinforced concrete" even though the appellant admits that one method of preventing crack propagation resulting from plastic shrinkage caused by changing temperature conditions is by adding reinforcing fibers to the "plain concrete" (specification, page 30). On pages 26-27, appellant's specification sets forth definitions of "plain concrete", "flexural reinforcing" and "reinforced concrete" as:

5. 'Plain concrete' is structural concrete in which the concrete is designed to carry all the flexural tensile stresses and any reinforcing material, when present, is assumed not to carry any flexural tensile stress. A 'plain concrete' structure is characterized as a structure whose maximum flexural strength is attained at the cracking load of the concrete. 'Plain concrete' is also any concrete that does not meet the criteria for reinforced concrete.

6. 'Flexural reinforcing' is material which is utilized in reinforced concrete and is designed to carry all the tensile bending stress on the reinforced concrete member while the concrete is assumed not to carry any tensile stress. Flexural reinforcing is provided in an amount and

¹ Support for our determination that the cracking strength of concrete is nominally increased can be found in newly discovered reference to Lankard 3,986,885 discussed later in this opinion. A copy of this reference is attached to this decision.

orientation such that the flexural strength of the member is not diminished after the concrete sets and cracks.

7. 'Reinforced concrete' is concrete containing sufficient flexural reinforcing to meet the minimum requirements of the applicable design code for reinforced concrete. Generally, the required minimum amount of reinforcing assures that the flexural load capacity of the reinforced concrete member is substantially greater than the flexural load at which cracking occurs.

It appears from the specification at page 26 and ACI 318R-89 Building Code Requirements for Reinforced concrete (ACI 318-89) and Commentary at 318/318R-18 that a person of ordinary skill in the art would understand "plain concrete" to be any concrete which does not meet the requirements of reinforced concrete. We also believe a person of ordinary skill in the art would have understood "plain concrete" to be a hard strong building material made by mixing a cementing material (portland cement) and a mineral aggregate (sand or gravel) with sufficient water to cause the cement to set and bind the entire mass.²

We can not determine the scope of "plain concrete" within the definitions set forth by the appellant. However, we conclude that fiber-reinforced concrete, like that taught in the Givens patent applied by the examiner, falls outside the scope of

² Definition of "concrete" taken from Webster's Ninth New Collegiate Dictionary, Merriam-Webster, Inc. 1984.

appellant's definition of "reinforced concrete" since the reinforcing fibers in the Givens patent are not designed to carry all the tensile bending stress but instead work with the concrete "not [to] impart significant tensile strength to the fibrous-concrete because of their own tensile strength . . . [but] [t]hrough restriction of the growth of cracks the useful tensile strength [of the concrete], both ultimate and firstcrack, of fibrous concrete are increased significantly over that of unreinforced concrete" (Givens, column 6, lines 10-18). Since fiber-reinforced concrete, like that taught by Givens, does not meet the criteria of appellant's definition for reinforced concrete, then by appellant's definitions supra, fiber-reinforced concrete, like that taught by Givens, would have been considered "plain concrete" since appellant's specification (page 26) sets forth that concrete which fails to meet the criteria of reinforced concrete is considered to be "plain concrete." However, we are not entirely sure that the fiber-reinforced concrete of Givens necessarily falls within the appellant's claim limitation that the reinforcing material does not carry **any** of the flexural tensile stress since it is the cooperation of the plain concrete and the reinforcing fibers that improves the useful tensile strength of the concrete significantly over that of unreinforced concrete. In this regard, we see nothing in

appellant's specification to aid the artisan in interpreting the metes and bounds of the claimed subject matter such that infringement can be avoided. Theoretically, a concrete structural member made according to the specification set forth in Givens would infringe the appealed claims if a designer in designing a load bearing concrete panel, set forth in Givens, **assumed** the fiber-reinforced concrete in the upper portion of the panel carried all the flexural tensile stresses and that the fibrous reinforcing material present was assumed to not carry any flexural tensile stress.

Because rejections under 35 U.S.C. § 102 and § 103 should not be based upon "considerable speculation as to the meaning of the terms employed and assumptions as to the scope of the claims", In re Steele, 305 F.2d 859, 862, 134 USPQ 292, 295 (CCPA 1962), based on our discussion supra we are unable to reach the merits of the rejections posited by the examiner because the subject matter encompassed by the claims on appeal cannot be reasonably understood without resort to speculation. When no reasonably definite meaning can be ascribed to certain terms in a claim, the subject matter does not become obvious, but rather the claim becomes indefinite. In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). While we might speculate as to what

is meant by the claim language, our uncertainty provides us with no proper basis for making the comparison between that which is claimed and the prior art as we are obliged to do. Accordingly, we are constrained to reverse, pro forma, the examiner's rejections of claims 57 through 66 and 69 through 79 under 35 U.S.C. § 102(b) and § 103(a). We hasten to add that this is a procedural reversal rather than one based upon the merits of the section 102(b) and section 103(a) rejections.

Under the provisions of 35 U.S.C. § 1.196(b), we enter the following new ground of rejection against claims 57 through 79.

Claims 57 through 79³ are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which appellant regards as the invention. Specifically, with regard to all the claims, the scope of the claim language "said **plain concrete** . . . is **designed to** carry all the flexural tensile stresses and any reinforcing material, when present, **is assumed not to** carry **any** flexural tensile stress" (emphasis ours) cannot be readily

³ With regard to claims 67 and 68 that were objected to by the examiner, we note that 37 CFR § 1.196(b) provides this Board with the authority to reject "any pending claim", including claims indicated by the examiner to be allowed or allowable.

determined as discussed supra. We further find the scope of claims 59 and 63 to be indeterminate for failing to clearly and concisely claim the invention. With regard to claim 59, the scope of "said flexural reinforcing [being] even lower if permitted by applicable codes" can not be readily determined since requirements set forth in bridge deck construction codes do not remain static and the specification fails to particularly set forth which codes fall within the scope of "applicable codes". With regard to claim 63, the scope of "said flexural reinforcing means being disposed . . . as close to said bottom surface of the panel as permitted by bridge structure standards" can not be readily determined since the AASHTO (American Association of State Highway and Transportation Officials) standards, like bridge deck construction codes, are subject to change and the specification fails to particularly set forth which standards fall within the scope of "bridge structure standards". There is nothing in the specification which clearly and concisely sets forth which particular "applicable codes" and which "bridge structure standards" are being referenced. Furthermore, since codes and standards are continually being added, deleted, updated, and revised, these claim limitations fail to clearly set forth whether the applicable codes and standards are those in

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effect at the filing of the original application or those in effect at some future time (i.e. at time of issuance or at time of infringement).

Finally, we note that all of the independent claims include at least one element for which there is no antecedent basis as shown by some illustrative examples which include, but are not limited to, the following: in claims 57, 72 and 74, "said plain concrete structure" lacks proper antecedent basis and in claim 70, "the casting", "said deck", "said forming", "said to-be-subsequently formed concrete panel", "said concrete composition" and "said plain concrete structure" lack proper antecedent basis. Also, in claim 70, line 17, it is unclear to which concrete (unset or plain) appellant is referring. Upon further prosecution of the subject matter, the appellant and examiner should thoroughly review all of the claims to ensure that every element has proper antecedent basis such that the meaning and scope of the claims are definite.

For all the above reasons, all pending claims on appeal are rejected under the second paragraph of 35 U.S.C. § 112 as being indefinite and/or misdescriptive. As such, we make no attempt to

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address the examiner's rejections of all claims on appeal under 35 U.S.C. § 102(b) and 35 U.S.C. § 103(a) as rejected by Givens and Givens in view of Kobayashi.

In addition to the foregoing, we find it further necessary to REMAND this application to the examiner in view of the newly discovered reference to Lankard 3,986,885 which gives several examples of nominal increases in flexural strength at first crack (see particularly, Table 2, batches A, F, I; column 7, lines 2-6) to plain concrete resulting from adding fibers to plain concrete within the ranges discussed in Romualdi 3,429,094, which patent is incorporated by reference into the disclosure of the Givens patent relied upon by the examiner. See column 5, lines 7-58 of Givens. We find the Lankard patent pertinent since Givens 3,808,085 uses the same special fibrous concrete disclosed in Romualdi in the same ranges but fails to give examples of flexural strength near the lower ranges set forth in the specification and which are at issue in this appeal. We further find Lankard to teach that fibrous concrete, in the lower ranges set forth in Givens, does not increase the flexural strength of the plain concrete substantially such that it would be considered reinforced concrete within the definitions set forth by the appellant. Specifically, although Lankard, at column 7, lines

3-6, Figures 2-3 and Table 2, shows "that fiber additions resulting in effective fiber bond areas less than about 1.8-in²/in² would provide no improvement in either [ultimate flexural strength] or [first crack flexural strength] over the plain mortar," Table 2, batch I shows a fiber-containing mortar beam having an effective fiber bond area of 1.5 in²/in² where the first crack and ultimate flexural strength of the beam containing the fiber mix is 45 psi stronger than the ultimate flexural strength of a plain mortar beam from the same concrete batch. Therefore, while the increase in flexural strength has been considered to be insignificant, in this example, by Lankard, there is an increase in the flexural strength ultimately and at first crack nonetheless. This reinforces our position that speculation would be required as to what amount of increased ultimate strength and first crack strength of fiber-reinforced concrete would be required over that of plain concrete such that a designer of a concrete panel would no longer assume that the reinforcing material does not carry **any** of the flexural tensile stresses for design purposes. Furthermore, although Givens and Lankard teach the concrete and fibers working together through restriction of crack propagation to increase the overall tensile strength of the "plain concrete", the ultimate strength of the concrete is not substantially increased over the flexural load at

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first crack, as required by appellant's definition for reinforced concrete, until over 2% by volume of fiber is added to the "plain concrete".

The examiner should specifically consider the combined teaching of Lankard and Givens (both citing Romualdi) in any further evaluation of appealed claims 57 through 66 and 69 through 79, since Givens fails to provide an example at the lower ranges set forth therein and Lankard specifically teaches the same ranges as Givens. Lankard, as previously discussed, further expressly states and gives an example of fiber-containing mortar beams wherein the flexural strength of the plain concrete is assumed to be unimproved at the lower ranges set forth in Givens.

It further appears necessary for the examiner to search Class 106 subclass 644 which appears to contain pertinent prior art. Class 106 is Compositions: Coating or Plastic. Subclass 644 is inorganic settable ingredient containing; free metal or alloy containing; iron or steel; fiber bar or wire containing.

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This decision contains a new ground of rejection pursuant to 37 CFR § 1.196(b)(amended effective Dec. 1, 1997, by final rule notice, 62 Fed. Reg. 53,131, 53,197 (Oct. 10, 1997), 1203 Off. Gaz. Pat. & Trademark Office 63, 122 (Oct. 21, 1997)). 37 CFR § 1.196(b) provides that, "A new ground of rejection shall not be considered final for purposes of judicial review."

37 CFR § 1.196(b) also provides that the appellant, WITHIN TWO MONTHS FROM A DATE OF A DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of proceedings (§ 1.197(c)) as to the rejected claims:

- (1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the application will be remanded to the examiner. . . .
- (2) Request that the application be reheard under § 1.197(b) by the Board of Patent Appeals and Interferences upon the same record. . . .

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No time period for taking any subsequent action in
connection with this appeal may be extended under 37 CFR
§ 1.136(a).

REVERSED; 37 CFR 1.196(b); REMANDED

CHARLES E. FRANKFORT)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
WILLIAM F. PATE, III)	APPEALS
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REVERSED 37 CFR 1.196(b);

REMANDED

Prepared: April 20, 2004